Amazon Power

Debbie Tewa

Donna Fischer

Laurie Stone

Technology, electricity, and power tools have traditionally been part of the male world. The renewable energy field is no different. If women have come so far in the past century, why are there still so few women in the renewable energy industry?

There are many reasons which vary from country to country. Yet everywhere, social, political, and economic factors influence the work people do. In most countries only a small percentage of women enter the science and technology fields. The barriers that women must overcome to enter the PV industry are diverse. The following four women have shown it is not impossible to overcome the gender barrier and enter the PV field.

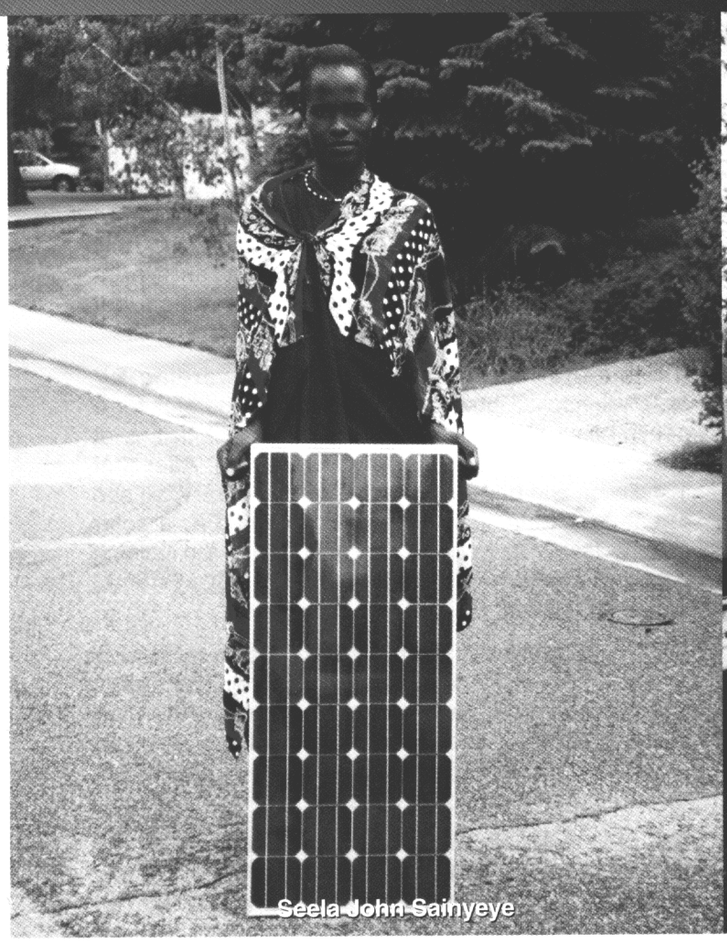
There are resources available for women who want to get involved in non-traditional fields such as photovoltaics. Some are listed at the end of this article. There is also a lot of support from women already in the field. There are women working in every aspect of renewable energy, from education to training to research. The women highlighted are examples of the many helping to bring renewable energy to people who need it.

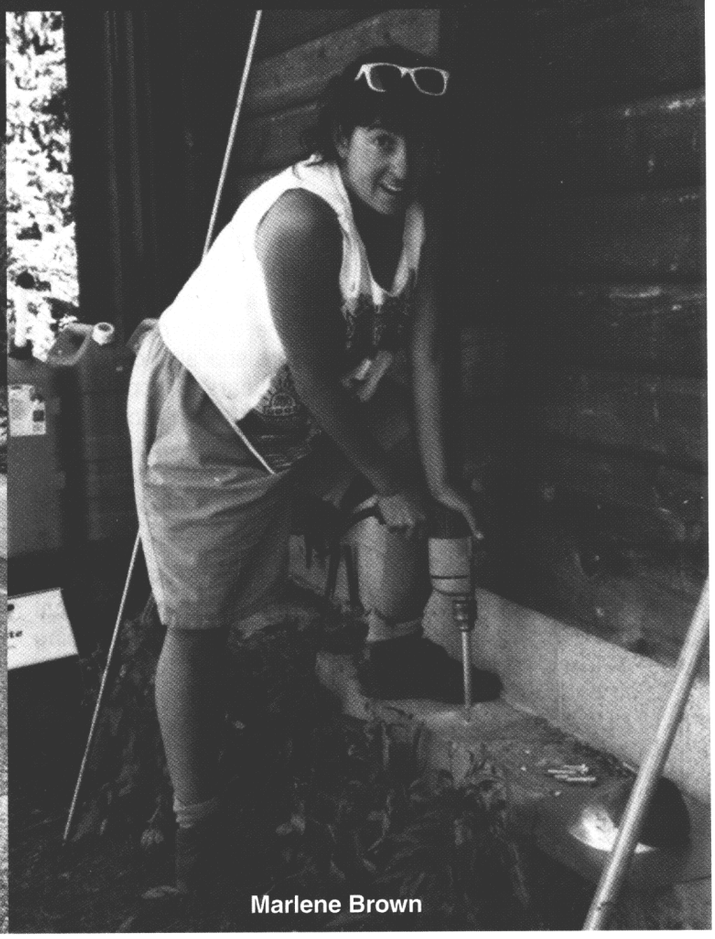
Self Sufficiency on the Hopi Reservation — Debbie Tewa

Debbie Tewa is the project director of the Hopi Solar Electric Enterprise, a project of the Hopi Foundation. The Hopi Foundation was started in 1984 to meet the community's needs. One of their largest projects, the Hopi Solar Electric Enterprise or "Native Sun," helps make solar electricity accessible to people on the Hopi Reservation and the neighboring Navajo Reservation.

Respect for traditional values and a distrust of outside agencies keep many Native Americans off the grid. Yet

Women and PV


Seela John Sainyeye


Marlene Brown

many Native Americans now want access to the modern conveniences that electricity can provide. Not only do PV panels use a traditional source of energy, but they also eliminate any need for an outside power company with its intrusive poles and distribution lines.

Debbie had been working as a commercial electrician in 1987 when she received a call from the Hopi Foundation asking if she would like to attend a photovoltaic training workshop. Debbie and four other Hopis were selected to attend Solar Energy International's (SEI) PV workshop. In 1991, she began working with Native Sun installing PV systems on the Hopi Reservation.

Since Debbie became involved with photovoltaics she has not encountered any gender problems. Unlike when she was working as a commercial electrician, Debbie feels that the PV industry is more accepting of women.

Debbie and her colleagues at Native Sun have installed over 320 PV systems. But they do not only install systems, they also educate people. According to Debbie, education is key to the Native Sun philosophy. Besides educating the users and owners of the systems she installs, Debbie travels around to schools and summer camps teaching Hopi children and teenagers about solar energy.

Debbie's most satisfying work is working with the Hopi people and making their lives better. By making PV electricity accessible she is helping people become self-sufficient. When people eventually pay off their systems and own their own electric company, it is very empowering. Debbie also serves as a role model for the young girls on the Hopi reservation by showing them that they do not need to be limited by their gender.

Debbie's advice to other women who want to get involved in the renewable energy field is, "Just get in there and do it." She advises women not to let PV technology intimidate them. "Sometimes it may be hard, but it's like life. If you decide that's what you want to do, you just have to do it."

Amazon Power — Donna Fischer

Donna Fischer has always been interested in helping the planet in any way she could. She never thought she could get involved in renewable energy technology because she had no experience. However, after she learned electrical skills, it seemed a much more accessible goal.

In 1988, as a single mom, Donna started an apprenticeship with an electrician. Having no previous electrical experience she ended up doing a lot of the grunt work. During that time, she also worked as an apprentice to a PV installer where she also did mostly "no-brainer" stuff. After a couple years of apprenticing she went to school to learn more of the technical part of electricity. She eventually took some hands-on photovoltaic workshops at SEI and, in 1993, started her own PV dealership in New Mexico called Amazon Power Company.

For Donna, the most important part of her work has been her personal growth. Moving from no technical knowledge of electricity to learning the skills and being able to apply them to help people has been very satisfying. She can see that bringing electricity to isolated people makes a big difference in their lives.

Donna finds most people in the renewable energy industry more supportive of women than in other technical fields. In the traditional fields, Donna felt more like an intruder. "Being an electrical apprentice is hard for anyone, and it was compounded by being female." Yet she feels that there are many people in renewables who respect her because she stuck with it.

That tenacity is what Donna thinks was the key to her success. When she first started doing electrical work there were a lot of people who didn't think a single mother with no technical skills could do it. But Donna was too stubborn to let them have the satisfaction of being right. She wants to encourage women to "just go for it in the best way you can, and don't give up." Donna's persistence resulted in Amazon Power Company.

Bringing Light to the Masai — Seela John Sainyeye

Seela John Sainyeye works for an organization in Tanzania called the Orkonerei Integrated Pastoralist Survival Program (OIPSP). It was started in 1991 in Tanzania to improve the quality of life for the Masai. OIPSP has six branches: environment, education, communication, health, human rights, and women. One of the projects in the environmental program is the solar project.

The solar project was started to demonstrate, evaluate, and make available affordable solar lighting systems for the Masai. The project coordinators are also researching and implementing solar lantern technologies to bring light to people who can't afford complete solar systems.

70% of the Masai women in Seela's community are illiterate. The need to improve women's lives by bringing them electricity was the main reason that Seela became involved with photovoltaics. Before photovoltaics came to Seela's community the only source of light was fire. Seela saw PV as a non-polluting energy source that could greatly help her people.

Seela's first and one of her most rewarding PV installations was powering a vaccine refrigerator for a health clinic. She helped out the other technicians at the clinic before she had any PV training. After that installation she decided to learn more about PV, so she attended a training workshop at KARADEA, a solar training facility in Kagera, Tanzania. Since the training program Seela has helped install 25 PV systems, mostly for lighting.

OIPSP has four solar technicians and Seela is the only woman. The only gender problem she encounters is that Masai women have a lot of responsibilities in the home. Many times she cannot leave her house to do an installation because she has to take care of her child or perform other household chores.

However, she says that more women in Tanzania are becoming interested in PV. OIPSP had a PV training workshop last April and six women attended. OIPSP has also started a day care center to make it easier for women to get involved in programs like the solar project. Seela tells women who want to learn more about PV electricity to come by OIPSP's office, look at the equipment, and start reading about the technology. "And if they can't read," she says, "we will explain it to them."

Making a Difference — Marlene Brown

Marlene Brown first became involved with renewable energy because she wanted to make a difference. She took a course in college called Energy Systems which exposed her to PV technology and piqued her interest. She did energy conservation work for awhile and, in 1989, attended a one year course offered by the founders of SEI to learn more about photovoltaic technology.

Since then Marlene has worked with the Solar Electric Light Fund (SELF) doing PV work internationally and Sandia National Laboratory doing research. Although Marlene finds her research work fascinating, her most satisfying work has been her international work. Marlene is the project manager for SELF's Vietnam Project (see HP #50). She spent four months in

Vietnam training technicians and users, and installing PV systems for rural electrification. She also spent two weeks doing a rural electrification project in the Solomon Islands. She finds this work so satisfying because "you can actually see it changing people's lives."

At Sandia National Labs, Marlene works in the PV Research lab. Although very different from actually being in the field and installing systems, she thoroughly enjoys her research. She is on the cutting edge of new technology for the PV industry.

Marlene is also currently a graduate student in electrical engineering. Being one of the few women grad students in her field and one of the only women in the PV Research Lab at Sandia has not been easy. She feels the more technical a woman gets, the more challenges she faces because of her sex. Marlene feels she needs to work harder than most men in her field to prove that a woman can do just as good a job. Marlene has encountered problems on all levels because of her gender. "The more you move into the men's field, the more you tread on their traditional roles, the more you have to prove yourself."

She concedes that it is not easy for women to enter technical fields because they don't initially get respect. Yet her advice to women who want to get into the PV industry is "Go for it and stick with it. Follow your heart, follow your dreams. You never know where you'll end up, but it will always pay off. Knowledge is a wonderful thing."

Overcoming the Gender Barrier

The reasons there are few women in the PV field are diverse. In developing countries, working outside of the home may not be an option for women who have many domestic responsibilities. In the United States, a woman may be faced with the challenge of working harder in a traditionally male field to prove that she is competent. Even women who overcome these barriers and enter the PV industry still face challenges working in a male dominated field.

The separation of skills by gender starts at an early age. The education system has been a large factor in women's exclusion from technology. Subjects that children study in school are strongly linked to a person's gender. Many young girls are not encouraged to take scientific and technical subjects while boys often are. Girls are often discouraged from taking technical classes. In many developing countries the education system can be even harsher for girls, with only boys being allowed to go past the primary grades. Half of the world's women continue to be deprived of higher education.

This discrimination in education systems affects people later in life. Due to women's lack of participation and training in technology, they have not been in an equal position to compete with men for technology employment. Women may also be restricted in choice of jobs due to family and domestic responsibilities. Intimidation is an added factor to overcome when joining a traditionally male field.

PV technology can greatly improve the lives of women. Photovoltaics can ease women's burdens by bringing lights to rural homes, electricity to health clinics, and water pumping systems to rural villages. And as the PV industry grows, more and more women will have access to this technology. Yet women need more than just access, they also need to participate in the development of these technologies as well as exercise control over their applications.

Technology is never neutral, and renewable energy technologies are no different. Men and women have different sets of skills, knowledge, and priorities. This means that women have something distinct to offer when they become involved in technologies. In the developing world, women spend more time in the home and with the family than the men do. Therefore, they may be aware of different needs that photovoltaic electricity can fulfill. In the developed world, women are more often the educators and are more likely to pass their knowledge of renewable energy on to young children. Throughout the world, women who are involved with photovoltaics can be role models for young girls who would like to get involved in technical fields.

I strongly encourage any woman who has an interest in renewable energy technologies to pursue her dream. These four women are only a few examples of the many women working with photovoltaics. Yet for every Debbie Tewa in the PV field, there are hundreds more women who have not been able to enter traditionally male dominated fields. However, just as renewable energy technologies have a lot to offer women, women have a lot to offer to the renewable energy field.

Access

Author Laurie Stone, Solar Energy International, PO Box 715, Carbondale, CO 81623 • 970-963-8855 • Fax: 970-963-8866 • E-Mail: sei@solarenergy.org
Web: www.solarenergy.org

Debbie Tewa, Native Sun Hopi Solar Electric, PO Box 660, Kykotsmovi, AZ 86039 • 520-734-2553
FAX: 520-734-2556

Donna Fischer, Amazon Power Company, RR 1, Box 1, Embudo, NM 87531 • 505-579-4089

Sella John Sainyeye, Orkonerei Integrated Pastoralis Survival Program, Box 12785, Arusha, Tanzania, East Africa

Marlene Brown, Sandia National Laboratories, Box 5800, Mailstop 0752, Albuquerque, NM 87185
E-mail: marlene@unm.edu.

Resources for Women in Technology:

In March of 1998, SEI will conduct a Women's PV Design & Installation Workshop in Tucson, AZ.

Advocates for Women in Science, Engineering and Mathematics, Oregon Graduate Institute of Science & Technology, PO Box 91000, Portland, OR 97291-1000
503-690-1261 • E-Mail: awsem@admin.ogi.edu
Web: www.wwide.com/awsem

Society of Women Engineers, 120 Wall St. 11th floor, New York, NY 10005-3902 • 212-509-9577
E-Mail: hq@swe.org • Web: www.swe.org

Dr. Barbara Farhar, Women In Sustainable Energy Development, NREL, 1617 Cole Blvd., Golden, CO 80401-3000 • 303-384-7376

Wider Opportunities for Women, 815 15th St. NW Suite 916, Washington, DC 20005 • 202-638-3143
E-Mail: wowinfo@w-o-w.org

Women in Technology International, 4641 Burnet Ave., Sherman Oaks, CA 91403 • 818-990-6705
E-Mail: info@witi.com • Web: www.witi.com